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and the individual apart, as Professor Adler's own system abundantly proves. And if I understand the spirit of his philosophy aright, he conceives only that uniqueness as worthwhile, as worthy to be contained and continued in an eternal divine life, which is the expression of what is *best* in man, the will to realize the eternal, universal, values. This is the view of the ethical idealists from Plato to Bosanquet, of whom Professor Adler is the spiritual brother.

*An Ethical Philosophy of Life* is a noble contribution to the field of ethics, noble in substance and noble in its literary form. The practical part of the work, which does not follow the beaten track, is of unusual interest and value, particularly the chapters dealing with the Vocations, the State, and the National Character; the brief discussion of educational questions (pp. 291–304) is admirable in its thoughtfulness and suggestiveness. The conception of the university as a group of vocational schools may be accepted if we conceive the vocations ethically, as Professor Adler does, if we regard as its aim "to furnish leaders for all the various groups who will undertake the great business of truly organizing democracy," and if we include in this latter task leadership in research. The college Professor Adler looks upon as "a legacy which has come to us from a type of society unlike our own," as "an institution designed for the education of gentlemen," and he thinks it will disappear. We must admit that there is some ground for this pessimistic description, but does it not suggest the reform rather than the elimination of the college? There would seem to be a particular need of the college, as the basis for vocational instruction, in our author's ideal democratic society, but it would have to be something more than a mere pathway to materialistic success or a resort for the acquisition of a superficial culture.

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*The Order of Nature: An Essay.* By LAWRENCE J. HENDERSON. Cambridge, Harvard University Press; London, Oxford University Press, 1917.—pp. v, 234.

This book is a continuation and further development of a line of thought initiated by the author in a work published in 1913 under the suggestive title *The Fitness of the Environment.* The relation of the volume before us to the earlier book may perhaps be best indicated by quoting some sentences from the introductory chapter. "In a recent book," he writes, "I have tried to recall attention to the many interesting peculiarities of the environment and to state the facts concerning the fitness of the inorganic world for life. . . . The primary constituents of the environment, water and carbonic acid, the very substances which are placed upon a planet's surface by the blind forces of cosmic evolution, serve with maximum efficiency to make stable, durable, and complex, both the living thing itself and the world around it. . . . Nothing else could replace them in such respects, for their utility depends upon a *coincidence* of many peculiar and unequaled properties which they alone possess. . . . In truth fitness of the environment is quite as constant a component of a particular case of biological fitness as is fitness of the organism, and fitness is quite as constantly manifest in all the properties of water and carbonic acid as in all the characteristics of living things. Such a conclusion, however, only touches the surface of the problem. . . . Just because life must exist in the universe, just because the living thing must be made of matter in space and actuated by energy in time, it is conditioned. In so far as this is a physical and chemical world, life must manifest itself through more or less complicated, more or less durable physico-chemical systems. Accordingly it is possible to assert and it will presently be demonstrated that the primary constituents of the environment are the fittest for those general characteristics of the organism which are imposed upon the organism by the general characteristics of the world itself; by the very nature of matter and energy, space and time. . . . The facts upon which this conclusion rests prove, I believe, that a hitherto unrecognized order exists among the properties of matter. Proceeding from the results of this earlier inquiry, I have, in the following pages, endeavored in a more rigorous manner to discuss the importance of the three elements [hydrogen, oxygen, and carbon] for the process of cosmic evolution and by eliminating all biological theories and principles to rest the conclusions exclusively upon the secure foundation of abstract physical science." But the author has also, as he says, "after much hesitation, ventured to sketch the development of thought upon the problem of teleology, and at length to confront the scientific conclusions with the results of philosophical thought, in order finally to attempt a reconciliation." But "the scientific conclusions are independent of the philosophical problem of teleology. . . . And "the present essay professes to demonstrate nothing but the existence of a new order among the properties of matter, and only to examine the teleological character of this order."

It would be difficult, even if I felt myself competent, to give a summary of the author's closely reasoned argument. I shall try to indicate merely the character of his main results, and shall add a few comments of my own in regard to certain views which he has expressed.

What Professor Henderson has done is to call attention to the fact that not only the biological sciences, but chemistry and physics as well, recognize the existence of an order which is not mechanical but forms the 'organization' or 'system' or 'pattern' within *which mechanical causes have meaning or relevancy.* Such a view is teleological, not only in the sense that there is a complementary connection between the different elements which compose the 'system,' but also in the sense that the earlier stages of the evolutionary process through which the 'system' passes must be regarded as a preparation for the later. That the concept of 'organization' is operative as a working principle within the biological sciences is too evident to admit of any debate. But that the sciences of inorganic nature also base themselves on the assumption of order and individuality in the systems of phenomena with which they deal is not so immediately apparent, and is from the point of view of the physical sciences a comparatively new doctrine. Yet it follows directly from the position maintained by philosophy since the time of Aristotle that what is real is individual. It is of great importance, however, to have this stated from the scientific point of view and supported by arguments drawn from the procedure and theories of representatives of the physical sciences. One result of this argument is to show, as Professor Henderson says, that "the problem of the teleological form and behavior of the organism merges in the larger question of the order of nature" (p. 116).

But Professor Henderson does not confine himself merely to calling attention to the reality of the teleological appearance of the world as a whole. This is a fact that it is no longer permissible to doubt. The question, however, remains "how the production of this order is to be scientifically explained. What is the mechanistic origin of the present order of nature?" (p. 119). The complete answer to this problem would involve an exhaustive statement of all the details of the evolutionary process, something which is of course impossible. Nor is it possible, according to the author, to explain the evolution of the existing order of nature solely in terms of general laws. These laws do not serve to account for the diversity which things assume in the process of evolution. "The general laws of science do not sufficiently account for the evolution of the globe. The Phase Rule, the second law of thermodynamics, the principles of statistical mechanics and the fact of the stability of dynamic equilibrium are all, like the laws of conservation and of gravitation, conditions of the process. But the process itself is the evolution of the original matter and the original energy of the globe. It is the properties of this matter and of this energy which chiefly bring to pass the manifold events in the history of the earth, or at least which make it possible that they should be manifold" (pp. 144–145). The problem of the coöperation of the laws of nature still appears to the author a genuine problem, but he regards it as less promising than that regarding the properties of matter and energy (pp. 148–149). His own specific contribution to the explanation of the teleological appearance of the existing order of nature confines itself to an examination of the properties and activities of the three chemical elements, hydrogen, oxygen, and carbon, which seem to him the main causes which explain the evolution of the diversity and stability among the systems which constitute the order of nature. "How is it that, on account of the peculiarities of these three elements, there are so many degrees of freedom left open in the evolutionary process" (p. 154)? This is the question which was treated in the author's earlier work, and the analysis of which, as he says, he has here endeavored to simplify and generalize.

Without attempting to follow the suggestive and instructive analysis of this problem, I wish to call attention to one fact which the author emphasizes, viz., that the scientific explanation of the existing order of nature which he furnishes rests upon an original and permanent order of relations between the three elements. The present teleological order is explained scientifically by showing it as the result of an earlier order among the elements which is capable of definite expression, but it is not derived from any chance play of unrelated mechanical causes. "We may therefore conclude that there is here revealed an order or pattern in the properties of the elements. This order is, so to speak, hidden, when one considers the properties of matter abstractly and statically, for it is recognizable and intelligible *only* through its effects. It becomes evident only when time is taken into consideration. It has a dynamical significance, and relates to evolution" (pp. 184–185). "It cannot be that the nature of this relationship is, like organic adaptions, mechanically conditioned. For relationships are mechanically conditioned in a significant manner only when there is opportunity for modification through interaction. But here the things related are supposed to be changeless in time, or, in short, absolute properties of the universe. According to the theory of probabilities this connection between the properties of matter and the process of evolution cannot be due to mere contingency. Therefore, since the physico-chemical functional relationship is not in question, there must be admitted a functional relationship of another kind, somewhat like that known in physiology. This functional relationship can only be described as teleological" (p. 211).

The form of argument leading up to these conclusions is at first sight different from that which speculative philosophy employs in its argument for the systematic and individual character of reality. But on reflection one sees that the methods are not diverse, but rather complementary applications of the same logical procedure of bringing to light the implicit assumptions in experience, of viewing it speculatively,—*i. e.*, seeing it in the completeness of its concrete detail and movement. The divergence in the order of facts to which appeal is made is more apparent than fundamental, and the two lines of argument are only different phrasings of the one philosophical interpretation. One cannot, I think, read a book like *The Order of Nature* without realizing that philosophy and science are not opposed, or even separable methods of inquiry, and that the distinctions between them after all are only provisional.

Though these conclusions are suggested by Professor Henderson's book, I am not sure that he would accept them. One finds cropping out here and there in his pages a strange hesitation in regard to philosophical results, and also the old assumption that mechanism affords a kind of intelligibility which is more complete than that of any other mode of explanation. It seems that he has not himself realized the transforming effect for natural science of the concepts which he has helped to establish. If the new concepts are recognized as legitimate, explanation in terms of mechanism can no longer be regarded as a complete and final answer even to the problems raised by the physical sciences. Mechanism is indeed not denied or abrogated, but as interpreted by this philosophy it becomes a means or instrument which contributes to the intelligibility of reality in terms of individual systems.

Scientists have frequently regarded it as a duty to lecture philosophers upon their predilection for *a priori* deductions and their neglect of facts. Doubtless these warnings have not been entirely unnecessary, and on the whole they have been accepted in good part by those to whom they were addressed. But are not they in their turn in need of the service of philosophy to warn them against the *a priori* domination of mechanistic conceptions and to help them appreciate other forms of intelligibility? It seems to me one of the most hopeful signs of the times that scientific thinkers are themselves now actively engaged in applying the results of philosophical reflection in an attempt to recognize the more concrete categories which are demanded by the actual facts of experience. In this connection Professor Henderson's book is one of great philosophical importance, and by the fresh light which it throws on many questions will also be found enlightening by students of philosophy. No one can read it without feeling himself the author's debtor.

Just because of my great appreciation of the book, however, I feel that I should specify my reasons for thinking that Professor Henderson has not himself quite realized the significance of the new standpoint which his analysis has reached. It is especially from his remarks regarding the relation of mind and body, in the chapter entitled "Biology" that I draw this conclusion. Although he recognizes explicitly the validity of the concept of 'organization,' the discussion of the relation of mind and body seems still to be carried on upon the old Cartesian assumptions; we still have left the 'tormenting psycho-physical paradox' without any suggestion of a possible principle of solution, but with the hope expressed "that in time this difficulty will somehow be circumvented" (p. 99). Again, on page 97, as a comment on a quotation from Hobhouse: "Consciousness does indeed inform us that the organism is more than a physical structure; no doubt it is a psycho-physical whole. Accordingly some of its actions do not, strictly speaking, conform to mechanical laws. An instance of this is a choice or any other psychical activity. But even so, it involves a further assumption to assert that the *physical* activities of the organism even when parts of psychophysical activities can ever be explained as not in conformity with mechanical laws." The last sentence, which might be parallelled by others from this chapter, exhibits the author as still holding fast to dualism, and to the notion of the organism as having a psychical part *plus* a physical part, which latter, *as purely physical*, would seem to demand a mechanical explanation. The true notion of organism, as expressed by Hobhouse in the quotation on this page,—that of "a system whose mode of action as a whole departs from that of mechanism in virtue of its specific quality"—is not grasped and applied, and consequently the old antinomies of the dualistic position are left standing. Professor Henderson appears still to hold fast to Kant's dictum, that where the possibility of a mechanical explanation ceases there ceases also the ground of intelligibility of phenomena. Perhaps one may set this down as an 'idol of the cave,' arising from his professional preoccupation with physics and chemistry. It is interesting to contrast this postulate with that of a thinker whose primary point of departure is furnished by the facts of the organic world. Dr. Haldane insists that biology, while recognizing the place and service of mechanism as an instrument, can make progress only by going beyond the physical and chemical conceptions of matter, energy, structure, cause, etc. It has been common to assume that it is only by employing mechanical conceptions that it is possible to deal scientifically with the facts of the material world—*i. e.*, to describe and explain their activities with exactness. Dr. Haldane, on the contrary, vigorously maintains that exclusive adherence to the mechanical dogma has on the contrary been a hindrance in dealing with the facts of biology. I quote a paragraph from his *Organism and Environment* (1917): "Anatomy and physiology, but more particularly anatomy, have become hidebound in the conception that living structure is simply physical structure; and in consequence of this anatomy has for the present the aspect of almost a dead science, in spite of the new life impulse from experimental embryology. The time has come for biology to liberate herself and step forth as a free and living experimental science, with a world before her to conquer by the help of clearer ideas of what life is, and how it can be investigated" (p. 103).

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